



# S.H.I.P.S.

**«Study on the Health Impact of air-Pollution in Ships»**

Undertaken by:



**National and Kapodistrian University of Athens**

**(Department of Hygiene, Epidemiology and Medical Statistics, Medical School and  
Laboratory of Analytical Chemistry, Department of Chemistry)**

and



**“Maria Tsakos” Foundation-International Center of Maritime Research  
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### ***Are you aware that air-pollution affects human health?***

- There have been many scientific studies in the last decades that show that air-pollution has adverse effects on human health. These effects can range from reversible (e.g. coughing, headache) to more serious (e.g. damages to nervous system, kidney, lungs) and even premature death. Air pollution exposure mainly comes from traffic, industry or heating.
- In ships, there are also sources of air pollution. The pollution mixture comprises mainly of particles (e.g.  $PM_{2.5}$  - particulate matter with diameter less than  $2.5\mu m/m^3$ ), VOCs (volatile organic compounds) and PAHs (polycyclic aromatic hydrocarbons).



### ***In this study we are interested in:***

- Measuring levels of exposure of mariners to air pollution to assess whether this exposure might constitute a health hazard.
- To achieve this, measurements will be made on board and whilst the ships are docked in the port, in liquid cargo, dry bulk and other dry cargo ships.
- The S.H.I.P.s. study will take place in the years 2013-14. Within this time period, measurements will be implemented once during the warm period and once during the cold period, for 9 non-consecutive days in each period covering times of sailing and being docked in port. During the measurement days fixed pumps will be placed onboard in pre-specified areas. Additionally, 3 mariners in each ship will be asked to carry with them small personal pumps that measure air-pollution, throughout the day.
- The mariners that will carry the personal pumps will be asked to fill in a questionnaire, with general information. Moreover, during the days of measurements they will be asked to fill in a «time-location activity sheet». This will help us identify how much time they have spent each day in each room and relate this information to the personal exposure measurements.

Personal pump for  $PM_{2.5}$



Passive sampler for VOCs



### ***What will happen with the data collected?***

- An anonymous database will be created with all the measurements and the information gathered. This data will be analyzed to assess how the individual exposure is accumulated, using the daily time-location activity data. Furthermore, we will investigate whether the observed levels of exposure might be associated with health risks.
- We are interested to propose, preferably simple and easy ways that may reduce the health risks of exposure to air pollution.
- The results from this study will be reported in Greek and International scientific meetings and journals.
- Mariners participating in the study will have access to their personal results.

### ***This study...***

There have been few studies that investigated the effects of mariners' exposure to air pollution on ships. This is the first study that attempts to have measurements on many ships, both while sailing and when in port. Its results will help us quantify the levels of air pollution that mariners are exposed to. Moreover, it will allow us to investigate ways to either reduce the exposure levels or to propose methods to reduce the associated health risks. We believe that these results will have a large impact in international shipping and the everyday life of a mariner.

### ***Contact us***

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